



## THP145 HYBRID GAS INSULATED SWITCHGEAR (HGIS)

**TGOOD**

Energy, Fast!

[tgood.com](http://tgood.com)

TGOOD produces over 5000  
switchgear units annually  
for projects around the globe

## **SOLUTION OVERVIEW**

- For use in affordable air insulated substations, HGIS technology allows additional components to be incorporated into the SF<sub>6</sub> gas insulated circuit breaker.
- Optional components include current transformers, voltage transformers, surge arrestors, isolation and grounding switches in a variety of configurations.
- Modular substations are ideal for expansions and retrofits within existing substation footprint.
- May be assembled as part of a modular substation complete with a prefabricated E-House.
- Best-in-class lead times measured in weeks, not months.
- Highly resistant to harsh environmental conditions.



## KEY BENEFITS

### FLEXIBLE

---

- › Requires up to 70% less surface area than comparable air insulated components.
- › Easy to install, prefabricated modules allow for rapid expansion of substations.
- › Option to mount HGIS on E-House roof conserves space and simplifies construction works.

### CAPABLE

---

- › Smart technology enables online monitoring, data analysis and automated diagnosis to keep operation safe and reliable at all times.
- › Modules can be energized within 24 hours of delivery.

### RELIABLE

---

- › Installation of a single self-contained module eliminates much of the installation risks compared to multiple air insulated components.
- › Reduced number of exposed parts compared to air insulated systems, minimizing the risk of failure due to environmental conditions.



## PRODUCT DESIGN

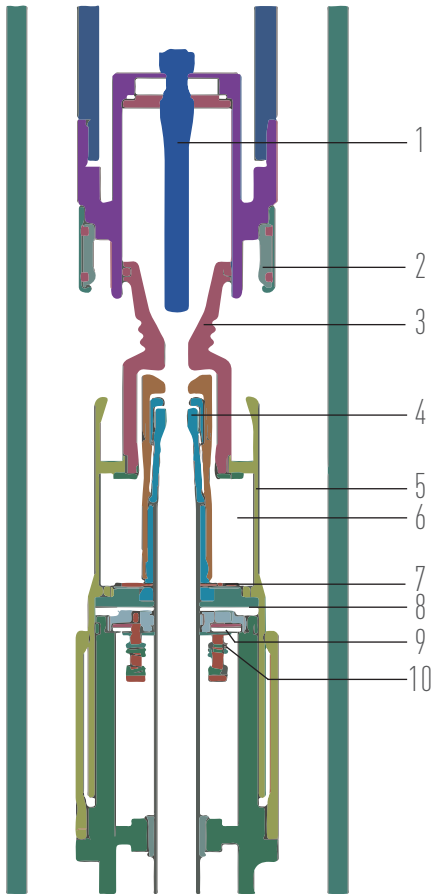
- > Modules individually configured and tested within an ISO 9001 factory environment.
- > Simple gas filling requires top-up with SF6 bottles only; no complex gas processing equipment required.
- > Compact modules require no special shipping considerations.



## CIRCUIT BREAKER

- > The TGOOD HGIS circuit breaker module is comprised of two interconnected structures: the stored-energy spring mechanism and the current interrupting unit.

1. Circuit Breaker Module: Integral Components
2. Spring Operating Mechanism Assembly



## CURRENT INTERRUPTING UNIT

- > Two separate current-carrying contact paths for each current interrupting unit; main contacts disconnect first and connect last to minimize arcing damage.
- > During a short circuit, arc-generated thermal pressure assists the spring operating mechanism to quickly pull contacts apart.
- > Arc-quenching design provides exceptional durability by minimizing mechanical stresses on circuit breaker components.

- 
1. Arcing Contact (Fixed)
  2. Main Contact (Fixed)
  3. Nozzle
  4. Arcing Contact (Moving)
  5. Main Contact (Moving)
  6. Contact Cylinder
  7. Thermal Expansion Chamber
  8. One-Way Valve
  9. Pressure Relief Valve
  10. Pressure Relief Spring



Spring Operating Mechanism

## STORED-ENERGY SPRING MECHANISM

- > Provides force to efficiently and reliably open and close the circuit breaker.
- > Accessible layout allows for straightforward viewing of spring mechanism position.
- > Sealed bearings and maintenance-free charging mechanism deliver decades of problem-free operation.



Current Transformer Structure



Contact Position Viewing Windows



Local Control Cabinet

## THREE POSITION SWITCH

- › Single three-position switching module incorporates both isolation and earthing functions.
- › Position indicators and viewing windows allow visual inspection of switch position.

## SILICONE RUBBER BUSHINGS (PORCELAIN OPTIONAL)

- › Hydrophobic material is impregnable to rainwater and contamination to keep bushings maintenance free.
- › Highly resistant to accumulation of dust and other pollutants.
- › Superior rupture and burst resistance.

## CURRENT AND POTENTIAL TRANSFORMERS

- › Current and potential transformers serve to provide key measurement and system protection functions.
- › Three-phase CT and PT modules can be positioned on either side of circuit breaker.
- › Wide range of protection and metering classes available.

## LIGHTNING SURGE ARRESTORS

- › Provide protection from excessive voltages that may occur in case of a lightning strike or switching transient.
- › Online monitoring and surge-count available with the use of integrated current sensors.

## LOCAL CONTROL CABINET

- › Provides central control and monitoring of the GIS module, including operation control, signal collection, relay protection, and SF<sub>6</sub> monitoring.
- › Waterproof, insulated, stainless steel cabinet for outdoor applications.
- › Climate control system with temperature and humidity sensors provide trouble free operation in harsh operating environments.



1  
2  
3  
4  
5  
6  
7

- 
- |                            |                          |
|----------------------------|--------------------------|
| 1. Silicone Rubber Bushing | 5. Voltage Transformer   |
| 2. Three Position Switch   | 6. Local Control Cabinet |
| 3. Current Transformer     | 7. Support Structure     |
| 4. Circuit Breaker         |                          |

# PRODUCT SPECIFICATIONS

Item	Unit	Specification	
Rated Voltage	kV	72.5	145
Rated Frequency	Hz	50/60	50/60
Rated Current	A	2500	2500
Power Frequency Withstand Voltage (phase-to-ground / phase-to-phase)	kV (1 min)	160/200	275/315
Lightning Impulse Voltage (phase-to-ground / phase-to-phase)	kV Peak	350/410	650/750
Short-time Withstand Current	kA (3s)	40	40
Peak Withstand Current	kA	104	104
SF <sub>6</sub> Pressure at 20°C (filling pressure/minimum pressure)	MPa	0.60/0.50	0.60/0.50
Moisture content of SF <sub>6</sub> gas at 20°C	ppm(v/v)	≤150	
SF <sub>6</sub> Leakage	%/year	≤0.1	
Noise Level When Tripping	dB(a)	≤110	≤110
Rated Operating Sequence		o-0.3s-co-180s-co	
Corona Extinction	kV	92	92
Partial Discharge (interval)	pC	≤5	≤5
Lifetime Ratings - Number of Operations			
Breaker (mechanical)	open/close	> 6,000	
Breaker (electrical)	short circuit trip	20	
Three Position Switch	open/close	> 3,000	
Quick Action Earthing Switch	open/close	> 3,000	

# ENVIRONMENTAL SPECIFICATIONS

Item	Units	Specification
Operating Environment		Indoor/Outdoor
Ambient Temperature	°C	-25 to 40
Elevation	metres above sea level	≤1000
Relative Humidity	%	≤ 90% Monthly Average ≤95% Daily Average
Seismic Intensity	G	Horizontal Acceleration: ≤ 0.5G; Vertical Acceleration: ≤ 0.5G



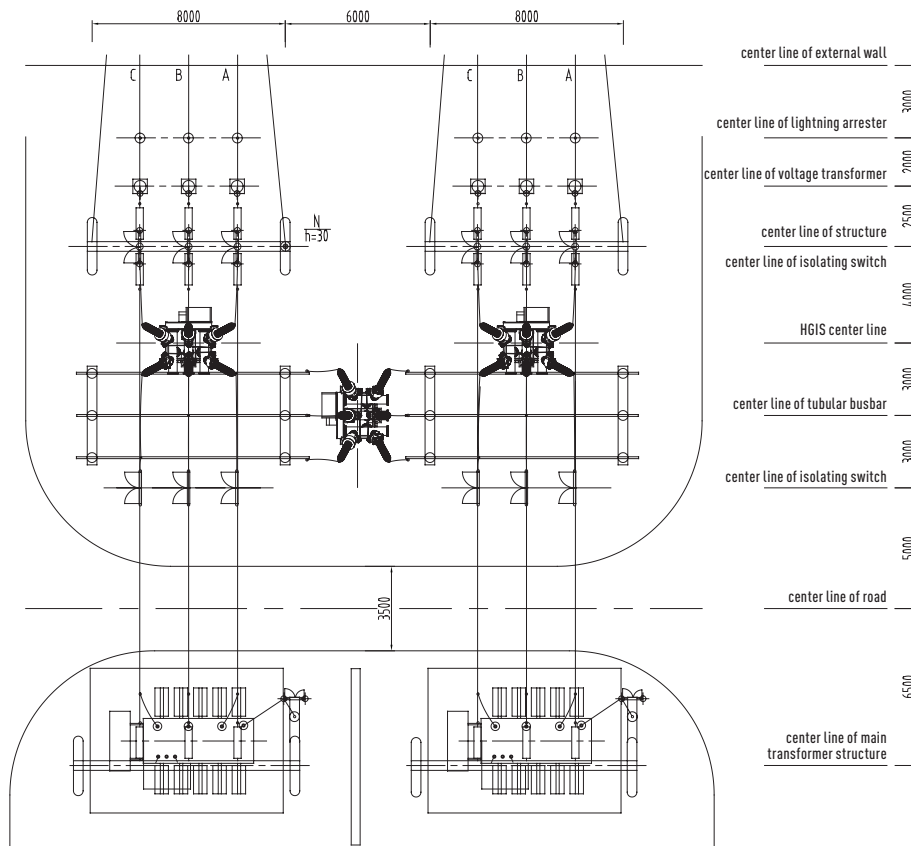


# > Prefabricated HGIS Substation

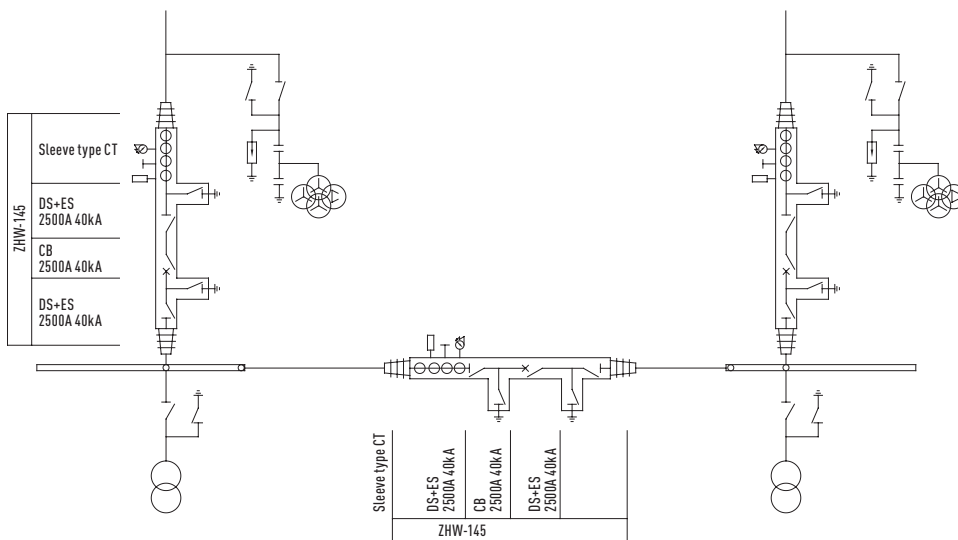


# 145KV HYBRID GAS INSULATED SWITCHGEAR

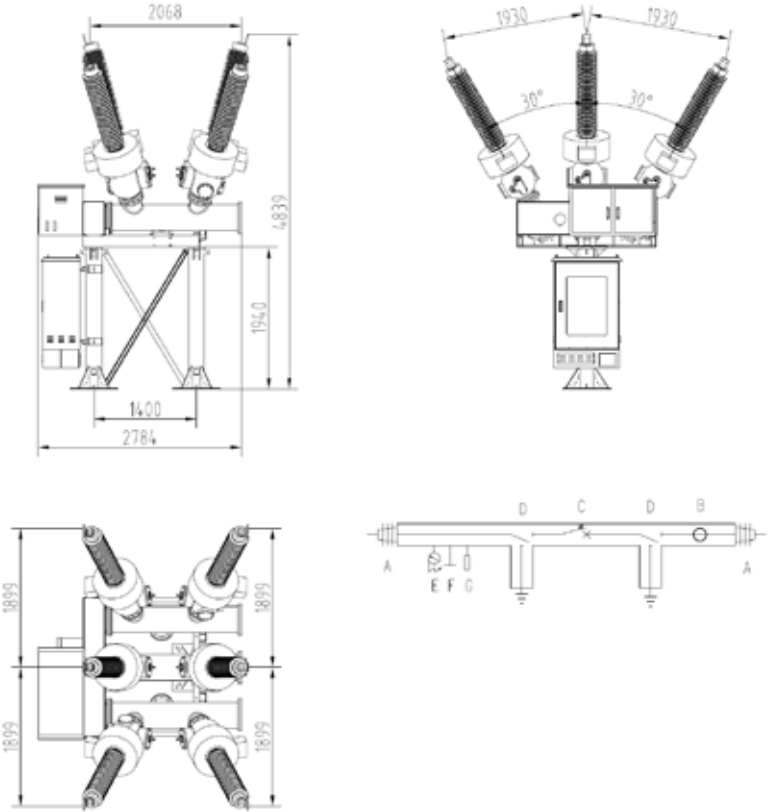
## > Plan View: Typical Application



## > Single Line Diagram: Typical Application



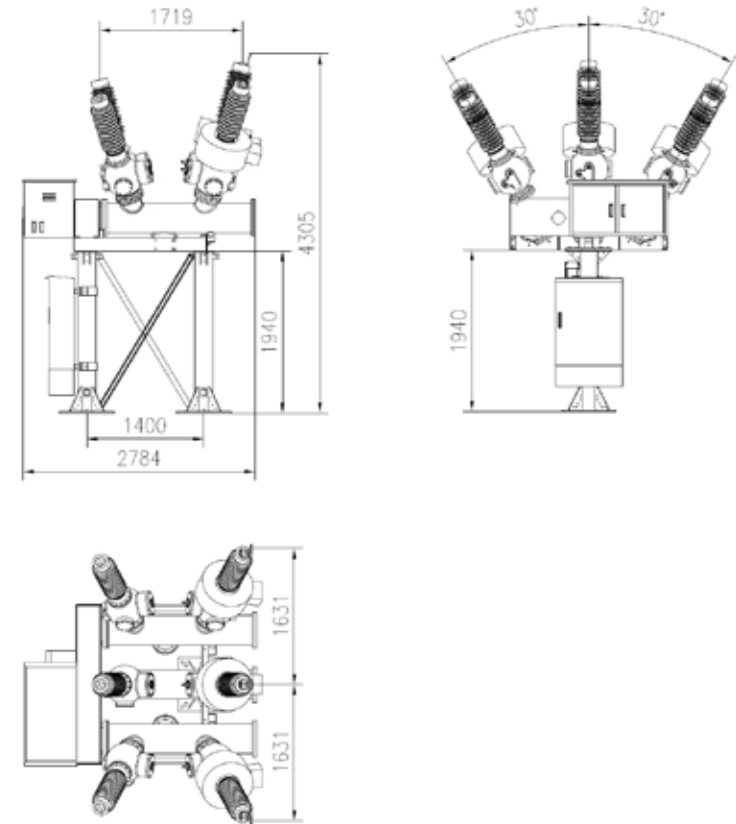
> Overall Dimension Diagram 145kV HGIS



**LEGEND:**

- A Silicone rubber bushing
- B Current transformer
- C Circuit breaker
- D Three position switch
- E SF6 pressure gauge
- F Rupture disc
- G Gas filling valve

> Overall Dimension Diagram 72.5kV HGIS



TGQDMK450010



[www.tgood.com](http://www.tgood.com)

TGOOD Global Ltd.  
Unit B, 8/F, Shun Ho Tower,  
24-30 Ice House Street,  
Central, Hong Kong

Tel: + 852 2393 8005  
Fax: + 852 2393 8808  
[sales@tgood.com](mailto:sales@tgood.com)